

# **Service Oriented Enterprise Architecture Framework**

## **For Enterprise Architecture at the Business Layer**

Laleh Rafati (1), Geert Poels (2)

(1) Enterprise Architecture Department, Behpardaz Jahan Company, Tehran, Iran.  
l.rafati@behpardaz.net, lalehrefati@gmail.com

(2) Faculty of Economics and Business Administration, Ghent University, Tweeckerkenstraat 2, 9000 Gent, Belgium  
Geert.Poels@UGent.be

### **Abstract**

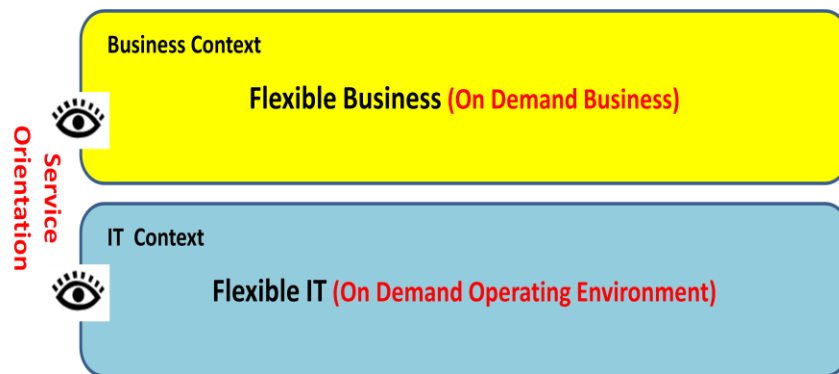
Service orientation is a paradigm or a way of thought that can be used into any contexts (e.g. IT, Business, Management, and etc.). In this paper, this paradigm has been applied into all layers of the enterprise to introduce a “Service Oriented Enterprise”. In this context, the main question is how to adapt enterprise architecture to this new structure orientation. The scientific contributions intended by this research is new knowledge on enterprise architecture frameworks at business layer through extracting basic concepts of componentization and service orientation based on IBM approaches that could reflect the structure and behavior of a service oriented enterprise and also adding a new decision maker’s view that could provide a good coverage of service oriented enterprise’s external aspect as well as internal aspect.

## 1- Service Orientation

Service orientation means many things based on various perspectives. Most of the definitions are relevant to IT context as web service, IT service, and service oriented architecture (SOA).

In this paper, service orientation has been considered as a paradigm or a way of thought that can be applied into any context (e.g. IT, Business, Management, and etc.). It has been defined for two contexts of IT and Business as below:

- **Service orientation in business context:** A way of integrating business as linked services and the outcomes that they bring. In this context, service orientation has been introduced as a solution to transfer a business to an on demand business or flexible business.
- **Service orientation in IT context:** An architectural style to address characteristics such as modularity, encapsulation, loose coupling, separation of concerns, reuse, composability and single implementation. In this context, service orientation has been introduced as an IT solution to transfer an operating environment to on demand operating environment.



**Service Orientation Paradigm**

Service orientation creates a common language for collaboration between business and technology leaders.

## 2- Service Orientation Value Proposition

Service orientation provides a value proposition for a set of distinct business challenges across the enterprise. Enterprises adopt service orientation as a way to address different business challenges:

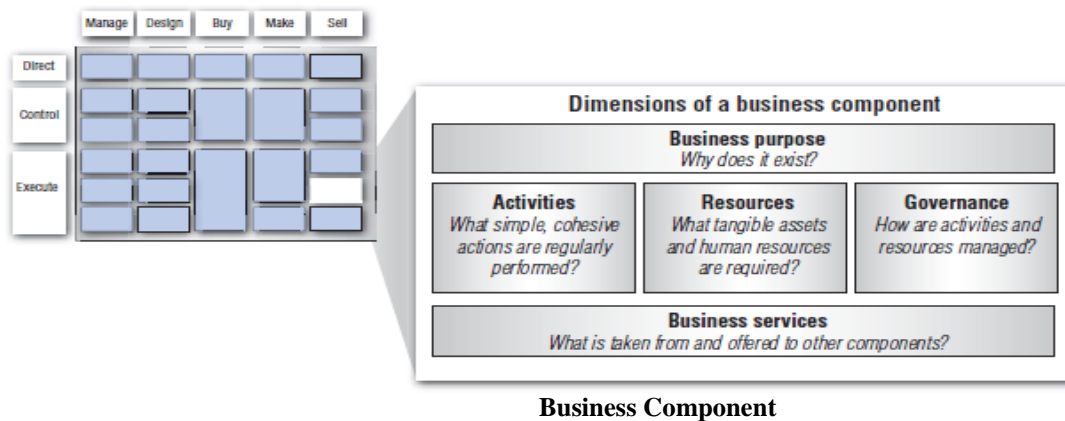
- **Increase revenue:** service orientation creates new routes to market and also creates new value from existing systems.
- **Integrate across the enterprise:** service orientation integrates historically separate systems and also facilitates mergers and acquisitions of enterprises.
- **Drive down cost:** service orientation eliminates duplicated systems, builds once and leverages, and improves time to market.
- **Provide a flexible business model:** service orientation causes reaction to market changes more quickly.

- **Reduce cycle times and cost for external business partners:** service orientation causes moving from manual to automated transactions, and also facilitates flexible dealings with business partners.
- **Reduce risk and exposure:** service orientation improves visibility into business operations.

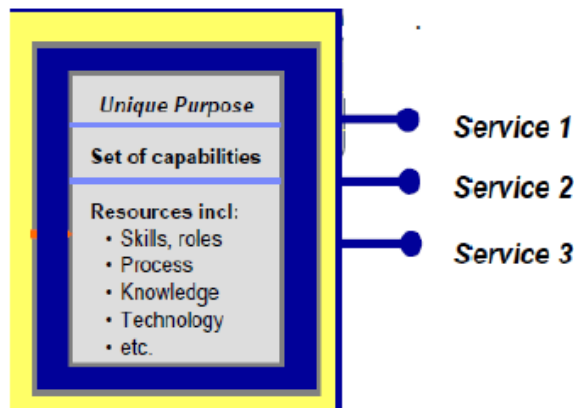
### 3- Componentization and Service orientation of Enterprise

The demand for innovation, flexibility and desire to create new revenue sources has led to rethinking enterprise structures. IBM approaches, “On Demand business” [1] and “Specialized Enterprise” [2], introduce Componentization and Service Orientation as important enablers in achieving flexibility required for dramatic business changes. [3]

- **Componentization:** a way to deconstruct an enterprise and then reconstruct into value nets, in which partnerships with customers and suppliers operate in a value network. The process of deconstruction/reconstruction is realized through business components (i.e. distinct business functions). A business component is a part of an enterprise that has the potential to operate independently. Business components represent a logical grouping of the work done within the enterprise and contain people, activities and supporting technology.

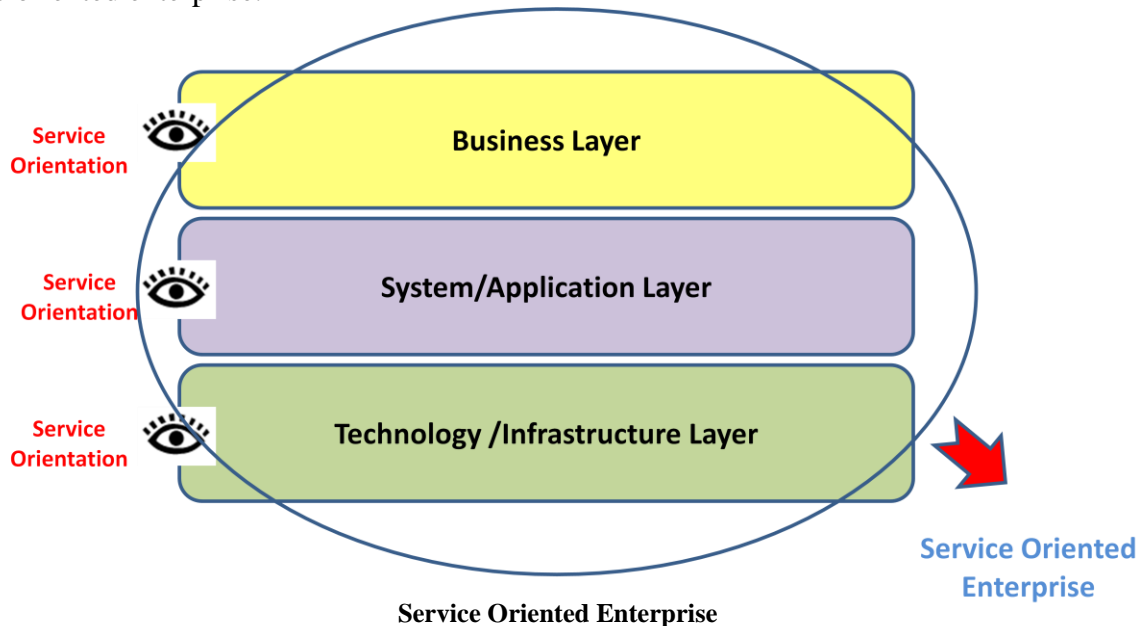


- **Service Orientation:** a way to seamless integration between business components. Each business component has business services which form the interfaces to other business components.



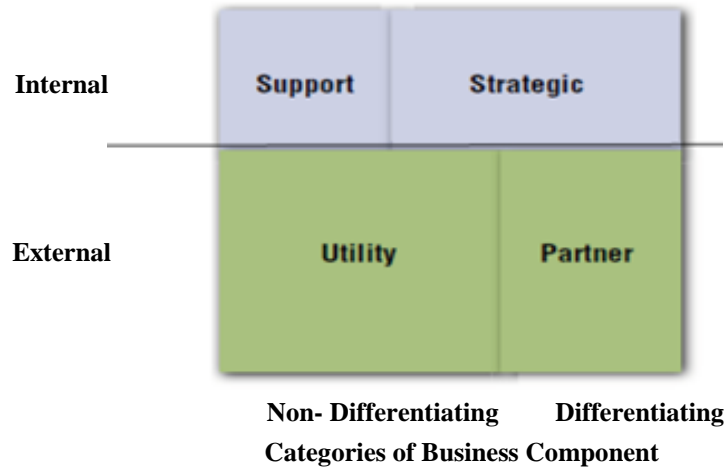
## 4- Service Oriented Enterprise: the Structure and Behavior

When service orientation applies into all layers of the enterprise, enterprise has been called service oriented enterprise.



**The Structure of a Service Oriented Enterprise:** According to IBM approaches, the structure of a service oriented enterprise is described through business components. A business structure model describes how the enterprise organizes its work in the form of non-overlapping business functions. Business components divided to the four categories listed below:

- **Internal Strategic Business Component:** strategic component embody functions that are critical to differentiating the firm in the marketplace, and so are internally owned and managed. These functions require enterprise wide focus and continuous reinvestment to sustain their competitiveness, and they must be managed to maintain absolute advantage against competitors.
- **Internal Support Business Component:** support component embody functions that are essential to meet the needs of strategy component. They are also managed internally but for reasons of economic efficiency rather than strategic differentiation.
- **External Collaborative/Partner Business Component:** activities with high strategic differentiation and low transaction costs are aggregated into partner components. As the name suggests, these components are owned and managed by external, best-in-class specialists who can deliver against on demand imperatives.
- **External Utility Business Component:** utility components are characterized by both low strategic differentiation and low transaction costs. Utility components can be outsourcing based on market conditions and the changing requirements of the organization.



**The Behavior of a Service Oriented Enterprise:** Business behavior model describes how an enterprise defines its internal business operations and the behavior of business partners exposed within its business ecosystem. In this context, business services represent the externalized view of the operations of a service-oriented enterprise.

According to IBM Service Integration Maturity Model (SIMM) (Arsanjani & Holley 2005c) [4] and also SOA Maturity Model (SOAMM) (Sonic Software Corp. et al. 2005) [5], business services are divided to the two categories listed below:

- **Simple/Internal Business Service:** Simple services are internal services that can be use to realize intra-organizational integration. They are focused on the integration of internal business processes.
- **Composite/Collaborative Business Service:** Composite services are collaborative service that can be use to realize public processes integration (supply chain integration). Composite services are external services to extra-organizational integration.

Service orientation enables the definition of components with well defined boundaries. To achieve the desired business outcome, these components collaborate with other components through services. In future research, services categories can be extend and rich by the service classification model developed in [6].

## **5- Problem statement: Service Oriented Enterprise Modeling and Architecture**

An enterprise model or an enterprise architectural description is a computational representation of structure and behavior of enterprise. Here, three prerequisites have been determined for enterprise modeling and architecture as below:

1. **Enterprise ontology:** The Enterprise Ontology is a collection of terms and definitions relevant to business enterprises. It can be used as a fundamental for enterprise modeling and architecture that helping to de-confliction of terminology and data and accurate modeling.
2. **Enterprise Architecture Framework:** it is needed to organize all perspectives of decision makers and the things viewed from each perspective across enterprise.

- 3. Enterprise Architecture Methodology:** guidance to the architect and architectural description development team to accurate and fit for purpose modeling.

Based on three prerequisites for enterprise modeling and architecture, service oriented enterprise modeling and architecture needs to:

- **An agreeable conceptualization of service orientation** that could reflect the structure and behavior of a service oriented enterprise. (Service Oriented Enterprise Ontology)
- **A new decision maker's view** (added to framework's views) that provide a good coverage of the externalized view of the operations of a service-oriented enterprise.

The important challenge about service oriented enterprise is architecture modeling and describing. Related to this challenge, some of the main questions are:

- Which of enterprise architecture frameworks can be considered to service oriented enterprise architecture? (e.g. FEAF, DoDAF, TOGAF or etc.) It is necessary that framework applies service orientation into all enterprise layers (Business, System, and Technology).
- What are the basic concepts of service orientation that could reflect the structure and behavior of a service oriented enterprise? Discovering and extracting these concepts will help architects and architectural description development team to collect right data for enterprise modeling and describing.
- Which of decision maker's views (of framework) provide a good coverage of external structure and behavior that has been formed by relationships with partner?

Indeed, key prerequisites for a service oriented enterprise modeling and describing are (1) right concepts of service orientation (2) a new decision maker's view to service oriented enterprise's external aspect (3) a framework to organize (1) and (2). It is important notice that service orientation paradigm is considered only at application/system layer of enterprise by all of well-known frameworks like FEAF, DoDAF and TOGAF.

## **6- A Service Oriented Enterprise Architecture Framework**

The objective of this research is to propose a service oriented enterprise architecture framework through extend existing frameworks at the business layer. The research approach is 1) to extract the basic concepts of service orientation to reflect structure and behavior of a service oriented enterprise based on IBM approaches and 2) to add a new decision maker's view to represent the things viewed from external perspective at the business layer.

An "Architecture Framework" is needed to organize the body of knowledge concerned and consists of a matrix in which the rows represent the perspectives of different decision makers across the enterprise and the columns represent the things viewed from each perspective or aspect.

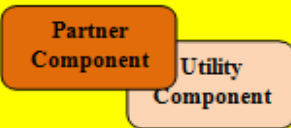

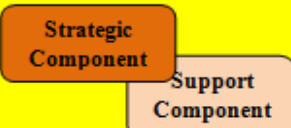

Enterprise Layer	Decision Maker's View	What Thing	How Activity	Where Location	Who People	When Time	Why Motivation
Business	Business Owner's view						
System	Designer's view						
Technology	Implementer's view						

**Enterprise Architecture Framework**

It is important notice that in the proposed framework the primary focuses are enterprise's business layer and also "What" and "How" columns to reflect the structure and behavior of service orientation. System (application) and technology layers are outside the scope of this paper.

It is clear need to a new viewpoint to capture that part of enterprise's functions that are formed through collaboration with partners. Hence business partner's view is added to business layer of a common framework.

- **Business Partner's View:** is an external perspective into service oriented organizational structure and behavioral to surround collaborative business components and composite services of an on demand business.
- **Business Owner's View:** is an internal perspective into service oriented organizational structure and behavioral to surround internal strategic business components and simple services of an on demand business.

Enterprise Layers	Decision Maker's view	Structural Aspect (What)	Behavioral Aspect (How)
Business	Business Partner's view		
	Business Owner's view		
System	Designer's view		
Technology	Implementer's view		

**Service Oriented Enterprise Architecture Framework**

## 7- Future Researches

In the future we would like to extend the proposed framework for other layers (System and Technology) based on IBM approaches like "On Demand Operating Environment" and IBM methods such as "Service Oriented Modeling and Architecture (SOMA)". We would also like to introduce an initial metamodel of service oriented enterprise with focus on approaches like [7] in service science and ontology that can be organized into the proposed framework.

## References

- [1] "On demand business: The new agenda for value creation." IBM Institute of Business Value, 2003.
- [2] Pohle, George, Peter Korsten, and Shanker Ramamurthy. "The specialized enterprise: A fundamental redesign of firms and industries." IBM Institute for Business Value, 2005.
- [3] L. Cherbakov, G. Galambos, R. Harishankar, S. Kalyana, and G. Rackham, "Impact of Service Orientation at the Business Level," IBM Systems Journal 44, No. 4, 653–668, 2005.
- [4] Arsanjani, A. Holley, K. "Increase flexibility with the service integration maturity model (SIMM)", 2005.
- [5] Mittal, K. , 'Service oriented architecture maturity model', SOAConsultant.Com, 2005.
- [6] Weigand H., Johannesson, P., Andersson, B., & Bergholtz, M. Value-based Service Modeling and Design: Toward a Unified View of Services. In Proc. of CAiSE '09, Springer, 410-424, 2009.
- [7] Geert Poels. The Resource-Service-System model for service science. 29th International conference on Conceptual Modeling: ER Workshops, 2010.